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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/688,070

10/17/2003

Douglas P. Doucette

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EXAMINER

MOFIZ, APU M

ART UNIT

PAPER NUMBER

2165

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,070

Applicant(s)

DOUCETTE ET AL.

Examiner

Apu M. Mofiz

Art Unit

2165

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,10,12,14-18 and 27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,10,12,14-18 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>04/30/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-7,10,12,14-18 and 27 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-39 of U.S. Patent No. 6,636,879. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims of U.S. Patent No. 6,636,879 contain every element of claims 1-7,10,12,14-18 and 27 of the instant specification.

"A later patent claim is not patentably distinct from an earlier patent claim if the later claim is obvious over, or anticipated by, the earlier claim. *In re Longi*, 759 F.2d at 896, 225 USPQ at 651."

Claim Rejections - 35 USC § 112

3. Claims 1 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claims 1 and 14, Examiner is unclear as to what is meant by "in response to said active map and at least one snapshot of the file system" recited. How does a map request for a determination? Further clarification is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1,6,7,14,16 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Hitz et al. (U.S. Patent No. 5,819,292 and Hitz hereinafter).

As to claims 1,14,16 and 27, Hitz teaches a method for improved space allocation in file system, including a file system having a set of storage blocks in a mass storage system (i.e., "The present invention also creates snapshots, which are virtual read-only copies of the file system. (col 4, lines 20-30) ... the present invention duplicates only the inode that describes the inode file. Thus the actual disk space required for a snapshot is only 128 bytes

Art Unit: 2165

used to store the duplicated inode. (col 4, lines 20-30) ... The present invention uses a Write Anywhere File-system Layout (WAFL). This disk format system is block based (i.e., 4 KB blocks that have no fragments), uses inodes to describe its files, (col 5, lines 48-52) ... WAFL inodes are distinct from prior art inodes. Each on-disk WAFL inode points to 16 blocks having the same level of indirection. (col 5, lines 60-64) ... For a file size greater than 64 MB, the 16 block numbers of the inode reference double-indirect blocks. Each 4KB double-indirect block comprises 1024 block numbers pointing to corresponding single-indirect blocks. In turn each single-indirect block comprises 1024 block numbers that point to a 4KB data blocks. (col 6, lines 35-41) ... A first meta-data file is the "inode file" that contains inodes describing all other files in the file system. (col 9, lines 25-28) ... **The inode file 1210** itself is stored in 4KB blocks on disk (or 4 KB buffers in memory). FIG. 12 illustrates that inodes 1210A-1210C are stored in a 4 KB buffer 1220. For on-disk inode sizes of 128 bytes, a 4KB buffer (or block) **comprises 32 inodes**. (col 6, lines 35-40) ... Another meta-data file is the "block map" (blkmap) file. FIG. 11A is a diagram illustrating a blkmap file 1110. The blkmap file 1110 contains a 32-bit entry 1110A-1110D for each 4 KB block in the disk system. It also serves as a free-block map file. (col 6, lines 50-55) ... the entry 1110A of blkmap file 1110 indicates a block that is part of the active file system. Bits 1-20 (BIT1-BIT20) are used to indicate corresponding snapshots, if any, that reference the block. (col 10, lines 8-11) ... Another meta-data file is the **"inode map" (inomap) file that serves as a free inode map**. FIG. 13A is a diagram illustrating an inomap file 1310. The inomap file contains an 8-bit entry 1310A-1310C for each block in the inode file 1210. **Each entry 1310A-1310C is a count of allocated inodes** in the

corresponding block of the inode file 1210. **FIG. 13A shows values of 32, 5, and 0 in entries 1310A-1310C, respectively. The inode file 1210 must still be inspected to find which inodes in the block are free.** (col 10, lines 18-28)” The preceding text excerpts and fig. 11, 12 and 13 indicate that inodes (i.e., inodes and snapshot inodes are used to describe files in the file system and write files on the disk. An inomap file has 8-bit entry for each block of inode file. Each inode file block contains 32 inodes of 128 bytes each. Each inode of the inode file points to a blkmap file of 16 blocks of 4KB size. Therefore the inomap file of an active file system maintains a map for allocated inodes i.e., the corresponding data blocks are not available for writing. For example in fig. 13A shows 1310A entry i.e., region 1310A has a value of 32 i.e., all 32 inodes (equal region) and their corresponding data blocks are allocated. In region 1310B (equal in size to region 1310A), 5 inodes and their corresponding data blocks are allocated. Therefore $32-5=27$ inodes and their corresponding data blocks are free. But to write data on the disk, which 27 are free have to be determined i.e., the inode file have to be inspected e.g., linearly searched. Therefore these values of 32,5 and 0 have to be considered to find out which blocks are free to write data on. These maps contain data in bits i.e., in binary numbers.)(FIG. 4; FIG. 11-16), including maintaining an active map of said storage blocks not available for writing data (See citations and explanations above); determining, for each one of a plurality of equal regions of said storage blocks in said mass storage system, a corresponding value responsive to a number of storage blocks available for writing data in said each one of a plurality of equal regions, in response to said active map and at least one snapshot of the file system, each snapshot of the file system being a copy of said active map at a previous time (See citations and explanations above); and selecting, based on the

Art Unit: 2165

values, at least one of said plurality of regions for writing data (See citations and explanations above).

As to claim 6, Hitz teaches that the corresponding value responsive to a number of storage blocks is a binary number (See citations and explanations in claim 1 rejection above) (Fig. 11A-D; Abstract; col 4, lines 5-45; col 9, lines 50-67; col 10, lines 1-19; col 11, lines 1-67; col 12, lines 1-67).

As to claim 7, Hitz teaches that the corresponding value determined for one of said regions is a binary number stored in a data block containing one or more of said binary numbers each corresponding to a unique region (See citations and explanations in claim 1 rejection above) (Fig. 11A-D; Abstract; col 4, lines 5-45; col 9, lines 50-67; col 10, lines 1-19; col 11, lines 1-67; col 12, lines 1-67).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2165

7. Claims 2-5,10,12,15 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hitz et al. (U.S. Patent No. 5,819,292 and Hitz hereinafter) in view of Hitz et al. (U.S. Patent No. 6,038,570 and Hitz_2 hereinafter).

As to claims 2 and 15, Hitz teaches selecting based on the values at least one of plurality of regions for writing data (See citations and explanations in claim 1 rejection above) (Fig. 11A-D; Abstract; col 4, lines 5-45; col 9, lines 50-67; col 10, lines 1-19; col 11, lines 1-67; col 12, lines 1-67).

Hitz does not teach setting an allocation threshold and comparing the values to the threshold.

Hitz_2 teaches setting an allocation threshold and comparing the values to the threshold (col 20, lines 19-30).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Hitz with the teachings of Hitz_2 to include setting an allocation threshold and comparing the values to the threshold with the motivation to be very efficient to write to stripes in the RAID array where there are no allocated blocks in a stripe on the data disks (Hitz_2, col 20, lines 27-30).

As to claims 3 and 16, HITZ teaches writing the data into the selected at least one of said plurality of regions (See citations and explanations in claim 1 rejection above) (Fig. 11A-D; Abstract; col 4, lines 5-45; col 9, lines 50-67; col 10, lines 1-19; col 11, lines 1-67; col 12, lines 1-67).

As to claims 4 and 17, HITZ_2 teaches setting the threshold based on percentage of the number of storage blocks available for writing data in the file system (col 20, lines 19-30).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Hitz with the teachings of Hitz_2 to include setting the threshold based on percentage of the number of storage blocks available for writing data in the file system with the motivation to be very efficient to write to stripes in the RAID array where there are no allocated blocks in a stripe on the data disks (Hitz_2, col 20, lines 27-30).

As to claims 5 and 18, Hitz teaches selecting based on the values at least one of plurality of regions for writing data (See citations and explanations in claim 1 rejection above) (Fig. 11A-D; Abstract; col 4, lines 5-45; col 9, lines 50-67; col 10, lines 1-19; col 11, lines 1-67; col 12, lines 1-67).

Hitz does not teach using threshold for selecting a region.

Hitz_2 teaches using threshold for selecting a region (col 20, lines 19-30).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Hitz with the teachings of Hitz_2 to include using threshold for selecting a region with the motivation to be very efficient to write to stripes in the RAID array where there are no allocated blocks in a stripe on the data disks (Hitz_2, col 20, lines 27-30).

As to claim 10, Hitz teaches said selecting comprises linearly searching said plurality of regions to select a first region based on corresponding values (See citations and explanations in claim 1 rejection above) (Fig. 11A-D; Abstract; col 4, lines 5-45; col 9, lines 50-67; col 10, lines 1-19; col 11, lines 1-67; col 12, lines 1-67).

Hitz does not teach using threshold for selecting a region.

Hitz_2 teaches using threshold for selecting a region (col 20, lines 19-30).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Hitz with the teachings of Hitz_2 to include using threshold for selecting a region with the motivation to be very efficient to write to stripes in the RAID array where there are no allocated blocks in a stripe on the data disks (Hitz_2, col 20, lines 27-30).

As to claim 12, Hitz teaches further including additional selecting when said data requires more blocks than available in the selected at least one of said plurality of equal regions (See citations and explanations in claim 1 rejection above) (Fig. 11A-D; Abstract; col 4, lines 5-45; col 9, lines 50-67; col 10, lines 1-19; col 11, lines 1-67; col 12, lines 1-67).


Points of Contact

Art Unit: 2165

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Apu M. Mofiz whose telephone number is (571) 272-4080. The examiner can normally be reached on Monday – Thursday 8:00 A.M. to 4:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached at (571) 272-4146. The fax numbers for the group is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.



Apu M. Mofiz
Primary Patent Examiner
Technology Center 2100

April 18, 2006